

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 April 2002 (25.04.2002)

PCT

(10) International Publication Number
WO 02/32654 A1

(51) International Patent Classification⁷: **B29D 28/00**

(21) International Application Number: PCT/KR00/01160

(22) International Filing Date: 17 October 2000 (17.10.2000)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant and

(72) Inventor: **LEE, Jin-Kook** [KR/KR]; 1092-26, Gohjae
2-dong, Yeonjae-gu, Pusan 611-072 (KR).

(74) Agent: **KIM, Young-Ok**; 1242-7, Yeonsan 5-dong, Yeon-
jae-ku, Pusan 611-085 (KR).

DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

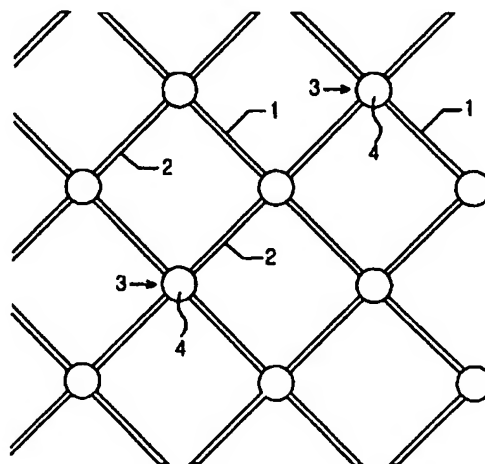
Published:

— with international search report

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: STRUCTURE OF KNOTTING MEMBER OF NET AND ITS MANUFACTURING METHOD



(57) Abstract: The present invention relates to knotting member (4) of net for fishery or industrial use and its manufacturing method, more particularly, the knotting member (4) made of synthetic resin formed on the intersection (3) of warp (1) and weft (2) by means of the plastic injection molding technique, the joinable assembly parts and the hot melt induced by ultrasonic or thermal heating device. The manufacturing method under the first embodiment of present invention relates to the plastic molding processes which can effectively construct the plastic bonding material onto the intersection (3) resulting the knot embedded by the synthetic resin, finally under the third embodiment of present invention relates to the hot melt processes which can effectively construct the plastic bonding material onto the intersection (3) resulting the knot embedded by the synthetic resin.

WO 02/32654 A1

Structure of knotting member of net and its manufacturing method

Technical Field

5 The present invention relates to knotting member of net for
fishery or industrial use and its manufacturing method, more
particularly, the knotting member made of synthetic resin formed on
the intersection of warp and weft by means of the plastic injection
molding technique, the joinable assembly parts and the hot melt
10 induced by ultrasonic or thermal heating device.

Background Art

Typical nets known to date include the so-called weaving knot
net formed either by tightly loop winding method to provide a loop
15 binding knot which is widely employed as a fishing net. The
conventional knotting structure in the prior arts is generally related to
the loop binding methods as shown on Fig. 7.

According to the prior art, the embodiments of knots have been
improved in the pursuit of the tight binding of knots regardless of the
20 usages. No composite function or special function related to the knot
is expected for the application of knotting member except the
secureness of net.

The tightened structure of knot may be disadvantageous in that
the knotting member never detach by itself. Especially if the
25 conventional fishing nets are disposed under the ocean or rivers, they
become very harmful weapons to the fish or creatures in the ocean
because the captured creatures therein shall be died. Furthermore the
disposed nets occurs the contamination to the earth environment.

According to the prior art of the knot binding method for
30 fabricating various net, the knot portion of net has no typical function
except maintaining the opening of net.

Disclosure of the Invention

This invention has been accomplished in view of the
35 above-mentioned background and is intended to provide synthetic

-2-

resin knots for conforming the various purposes of net depending on the usages.

Accordingly, the present invention is to provided that new structure of knotting member which has diverse applications and manufacturing method for fabricating the knotting member embedded by the synthetic resin based on the three kinds of illustrations which are related to the formation of knotting member using the synthetic resin.

10 Brief Description of the Drawings

The foregoing and other objects, aspects, and advantages will be better understood from the following detailed description of preferred embodiments of the invention with reference to the drawings, in which :

15 Fig 1 is a perspective view of the finished knotting member according to the present invention.

Fig 2a is a perspective view of a mold for fabricating the knotting member and Fig 2b is a perspective view of knot after the injection molding.

20 Fig 3 shows a perspective view of setting arrangement for fabricating the knotting member under the embodiment of present invention

Fig 4 is a illustrative view for the multi-head type injectors of molding under the embodiment of present invention

25 Fig 5 is a perspective view of the assembly state of knotting member under the second embodiment of present invention.

Fig 6 is related to a sectional view of the second embodiment under the present invention

Fig 7 is an typical example view of the prior art.

30

Best Mode for Carrying Out the Invention

Hereinafter, the preferred embodiments of knotting member according to the present invention will be described in detail with the references of accompanying drawings.

35 Fig 1 is related to illustrate the structure and method for the

-3-

finished net under the present invention.

In contrast to the conventional knot mentioned on the Fig 7 of the prior art, the fabrication method and the structure under the present invention is totally different from the weaving knot net.

5 The manufacturing method under the first embodiment of present invention relates to the plastic molding processes which can effectively construct the plastic bonding material onto the intersection 3 resulting the knot embedded by the synthetic resin, and under the second embodiment of present invention relates to the joinable
10 assemblies which can effectively construct the plastic joining material onto the intersection 3 resulting the knot embedded by the synthetic resin, finally under the third embodiment of present invention relates to the hot melt processes which can effectively construct the plastic bonding material onto the intersection 3 resulting the knot embedded
15 by the synthetic resin.

Hereinbelow, one should be noted that the vital embodiment of knotting member 4 under the present invention includes the technological application of plastic material made of synthetic resin.

20 Accordingly, the knotting member 4 under the present invention provides the valuable applications in the industries by means of the changes of shape, material, and color.

 Under the application of present embodiment, the regular distribution of knotting member 4 denoted by its colors or shapes and the functional applications of material enhance the value of product
25 and change the general concept of weaving net.

First illustration of the embodiment ;

The first illustration of the present invention is related to Fig 3 to Fig 4.

30 A flat mold 5 having vertical groove 6 and horizontal groove 7 is configured so as to set the warp 1 and weft 2. At the position of the intersections formed by the vertical groove 7 and the horizontal groove 6, the molding chamber 8 having the spherical shape are installed for the injection. Obviously, the appearance of molding
35 chamber 8 can be freely configured such as elliptical figure or

-4-

rectangular form etc. depending on the purposes of the usages.

For the continuous fabrication process, plurality of roller 9 installed apart from the mold frame 5 supply continuously the wrap and weft though the vertical groove 6 and horizontal groove 7 along the specified direction.

As shown on Fig 4, the plurality of injection machine 11 are set to match the injection nozzles onto the molding chamber 8. The injections of synthetic resin occur simultaneously according to the up and down motion of injection machine 11.

As shown on Fig. 2a, the guide grooves 12a for the gates of the wrap and weft and the inner concaved groove having the preset shape corresponding to the appearance of knotting member 4 are configured.

Based on the above mentioned equipment, the multi head injection machine 11 injects continuously the synthetic resin onto the molding chamber 8.

By means of the point injection method, the net having the knotting member 4 embedded by synthetic resin is accomplished according to the embodiment of plastic injection.

In accordance with the demands or usages for the preferred net, the types of synthetic resin and choices of its colors can be selected with the wide applications. For the application to a fishing net, the present invention is especially useful in that the fishing net of knots having the decomposable synthetic material protects the environment of ocean. If there occurs disposal of fishing net made of the decomposable resin in the ocean, the reaction between the synthetic resin of knot and the salting property of ocean occurs during the period so that the binding of the junction knots are loosed resulting the decay of fishing net in the natural way for the creature in ocean.

For the case of the general industry, if the decomposable resin is used for making the knots of net according to the present invention, the buried net having the decomposable knots facilitates the decay of the net preventing the environment of earth.

As mentioned, the shapes and colors of knotting member freely

-5-

can be utilized for enhancing the decoration means or functional usages under the present embodiment. For example, utilizing the combination of color or shape of knotting member, one can use it for denoting any notice or sign thereon or also one can utilize for the
5 advertising or distinguishing means in addition to the original function of net.

Of course, the opening of net can be configured in the special shape of diamond crossing type without difficulty rather than the rectangular shape of opening in the prior art. Furthermore according to the
10 present invention, the shape of opening under present invention can be applied into a polygon shape with the appropriate setting of the roller in connection with the mold frame .

Second illustration of the embodiment ;

15 Fig. 5 is related to the second embodiment of present invention.

This illustration is characterized in that the knotting member 4 relates to an assembly type which can be combined by means of a pair of joinable assemblies which are pre-fabricated by the separate
20 process using the injected synthetic resin.

Accordingly, the pair of joinable assemblies 4a, 4b having the combining extrusion 4c and the combining intrusion 4d are set so as to match the intersection formed by the wrap 1 and weft 2. After the assembly combination, the joint portions of the knotting member 4 can
25 be tightly secured by the process of high frequency heating or laser shot technique.

Although the embodiment of assembly member reveals the low productivity comparing with the other illustrations, the application under the second illustrated embodiment is suitable for manufacturing the
30 functional net or special purposed net. For examples, the knotting member can be applied for utilizing the light emitting means, decoration means, perfuming means, advertising means, warning sign and any other means in addition to the original purpose.

35 **Third illustration of the embodiment ;**

-6-

In connection with the third illustration, no drawing is illustrated but this application will be briefly described as followings. Third embodiment for bonding of the intersection 3 under the present invention can be completed using the thermally melted synthetic resin or the hot melt of synthetic resin induced by an ultrasonic heating or a thermal heating device onto the intersection 3.

In the case of ultrasonic heating device, the formation of knotting member 4 can be achieved selectively in accordance with the bonding onto the folded crossing intersection or the planar welding which is related to the bonding technique after cutting the folded crossing area.

Industrial Applicability

According to the present invention, the applications to the industrial utilization is greatly enhanced because of the following reasons : firstly when the invention is applied to a fishing net, the knotting member having decomposable synthetic material protects the ocean and the earth environment, secondly the functional net can be achieved depending on the size, shape, material and color of the knotting member for enhancing the demand or function of the net, thirdly the manufacturing methods of knotting member is widely selective as shown on the described illustrations, finally although the illustrated embodiments are related to the planar structure of net but it can be applied to a basketball net, for example, or any other three dimensional products.

While the invention has been described in terms of a few preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

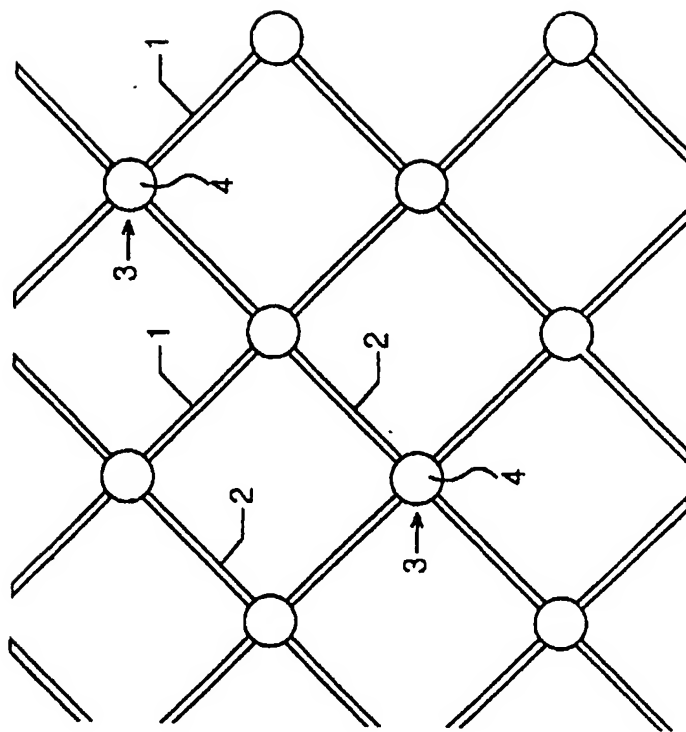
-7-

Claims :

1. A structure of knotting member for fabricating weaving net comprises
said knotting member 4 formed onto said intersection 3 crossed by
5 said warp 1 and said weft 2 and
the structure of said knotting member is characterized in that
said intersection 3 is embedded by said synthetic resin or said plastic
material.
- 10 2. The manufacturing method of knotting member 4 as defined
in claim 1 wherein said injection machine 11 are set to match said
injection nozzles onto said molding chamber 8 and
the manufacturing method of said knotting member 4 is
characterized in that the formation of said synthetic resin onto said
15 intersection 3 is achieved by said multi head injectors of said injection
machine 11.
3. The manufacturing method of knotting member 4 as defined
in claim 1 wherein said joinable assemblies 4a, 4b are set to match
20 said intersection 3, and
the manufacturing method of said knotting member 4 is
characterized in that the formation of said synthetic resin onto said
intersection 3 is achieved by combination of said joinable assemblies
4a, 4b.
- 25 4. The manufacturing method of knotting member 4 as defined
in claim 1 wherein said hot melt are set to match said intersection 3,
and
the manufacturing method of said knotting member 4 is characterized
30 in that the formation of said synthetic resin onto said intersection 3 is
achieved by said hot melt induced by said ultrasonic heating or said
thermal heating.
5. A knotting member according to claim 1, wherein said
35 synthetic resin is said decomposable resin.

1/6

Fig. 1



2/6

Fig. 2a

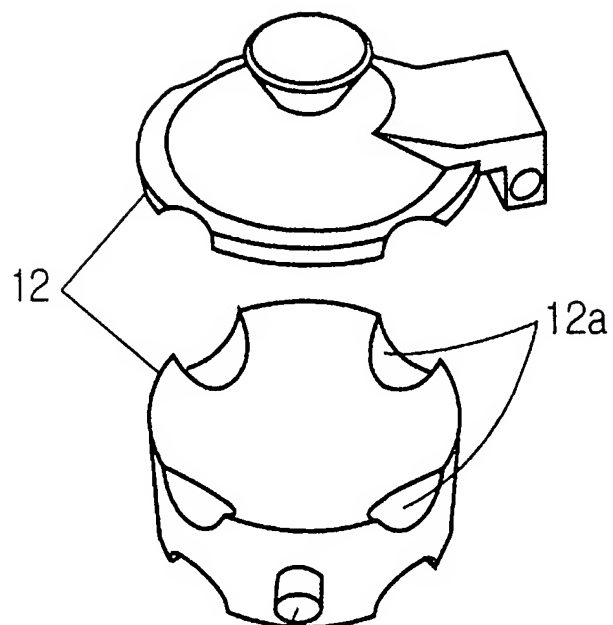
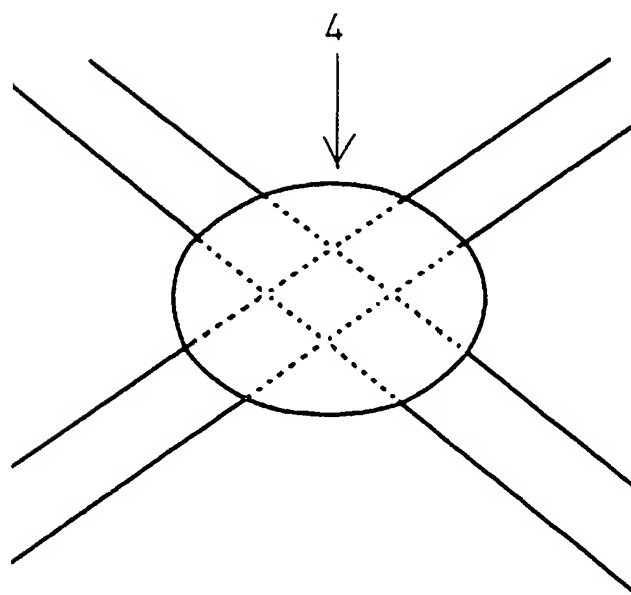


Fig. 2b



3/6

Fig. 3

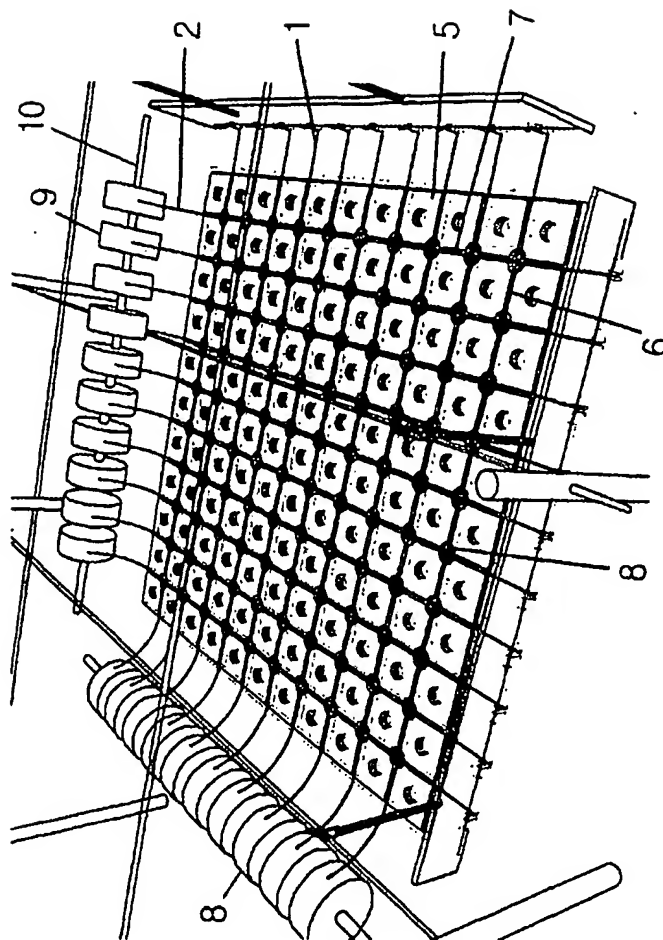


Fig. 4

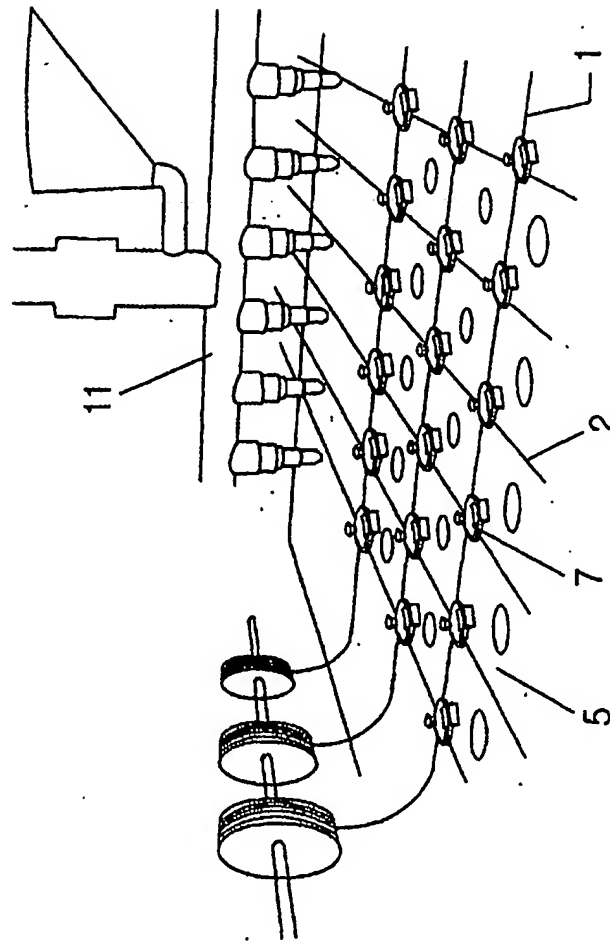
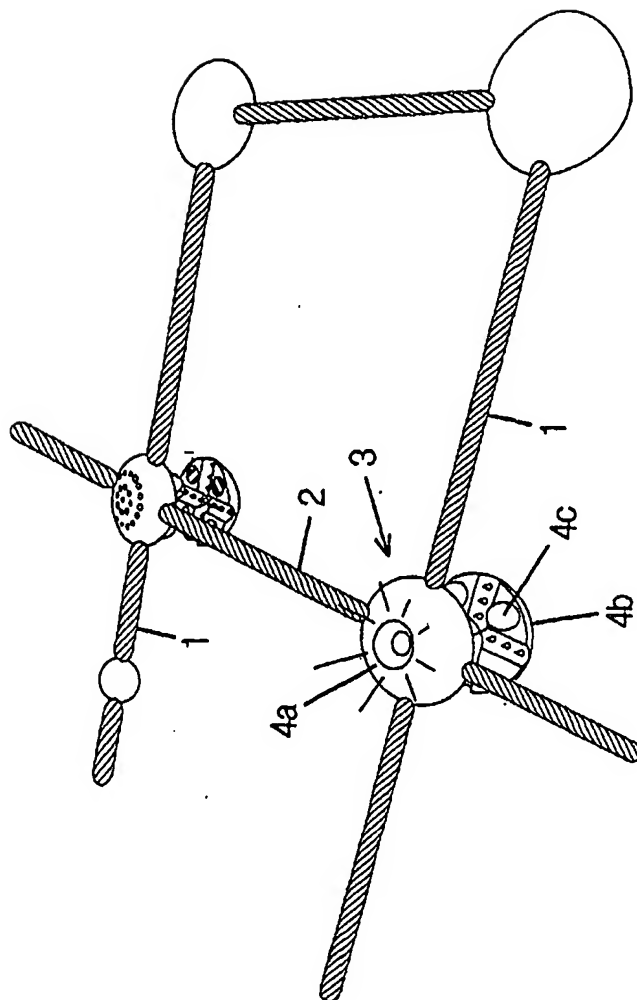


Fig. 5



6/6

Fig. 6

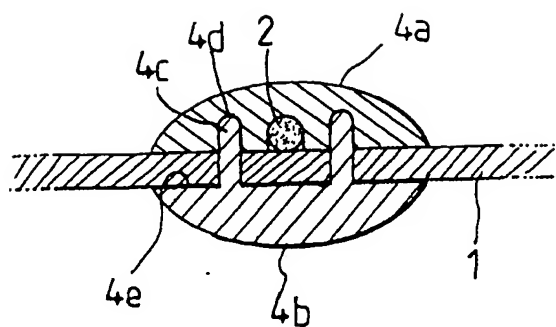
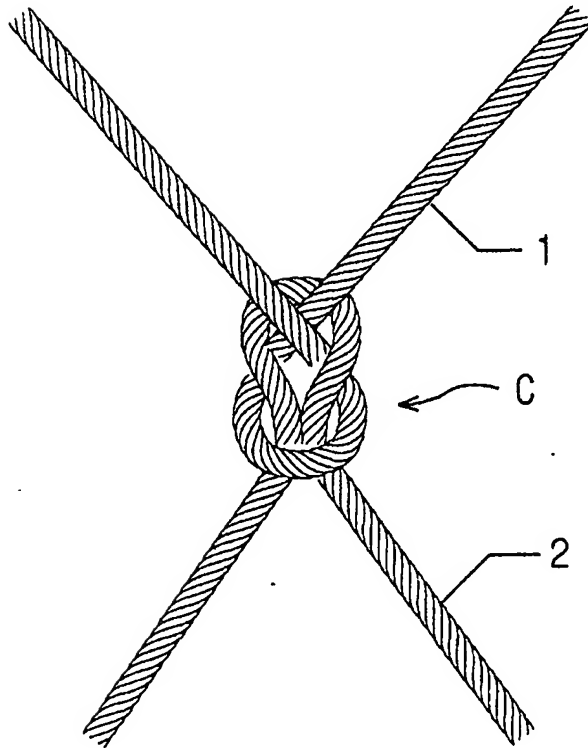


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 00/01160

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: B29D 28/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: A47C, B29C, B29D, D04C, D04G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 2049439 A (ITZEHOER NETZFABRIK AG), 13 April 1972 (13.04.72) <i>page 2, lines 18 - 26; page 4, line 26 - page 5; claims 1, 2; fig. 1-7.</i>	1,2,4
A		3,5
X	GB 1410945 A (BRAMLEY), 22 October 1975 (22.10.75) <i>page 1, lines 64 - 77; claim 1; fig. 1,2.</i>	1,2
A		3-5
X	US 4201814 A (GILBERT), 6 May 1980 (06.05.80) <i>claim 1; fig. 1-5.</i>	1
A		2-5
X	US 4112163 A (BROKMANN et al.), 5 September 1978 (05.09.78) <i>claim 1; fig. 1.</i>	1
A		2-5

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

..A" document defining the general state of the art which is not considered to be of particular relevance

..E" earlier application or patent but published on or after the international filing date

..L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

..O" document referring to an oral disclosure, use, exhibition or other means

..P" document published prior to the international filing date but later than the priority date claimed

..T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

..X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

..Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

..&" document member of the same patent family

Date of the actual completion of the international search

21 May 2001 (21.05.2001)

Date of mailing of the international search report

7 June 2001 (07.06.2001)

Name and mailing address of the ISA/AT

Austrian Patent Office
Kohlmarkt 8-10; A-1014 Vienna
Facsimile No. 1/53424/535

Authorized officer

SCHMELZER

Telephone No. 1/53424/469

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR 00/01160

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 09 107843 A (TORII KASEI KK), (abstract) 28 April 1997 (28.04.97) . In: Patent Abstracts of Japan [CD-ROM].	1
A	----	2-5

Form PCT/ISA/210 (continuation of second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 00/01160

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
DE	A	2049439	13-04-1972	none			
GB	A	1410945	22-10-1975	none			
JP	A2	9107843	28-04-1997	none			
US	A	4112163	05-09-1978	DE	A1	2532613	10-02-1977
				FR	A1	2318606	18-02-1977
				FR	B1	2318606	09-05-1980
				JP	A2	52015763	05-02-1977
US	A	4201814	06-05-1980	DE	A1	2828899	18-01-1979
				GB	A	1595331	12-08-1981
				NL	A	7807044	04-01-1979